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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/053,488  
Filing Date: November 02, 2001  
Appellant(s): MCKINLEY ET AL.

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Joel R. Meyer  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 7/7/08, 7/25/08, and 2/27/09 appealing from the Office action mailed 12/4/07.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

5,960,081	VYNNE et al	9-1999
6,611,830	SHINODA et al.	8-2003
6,389,421	HAWKINS et al	5-2002

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 102***

1. Claims 4, 18-19, 23-24, and 26-28 are rejected under 35 U.S.C. 102(c) as being anticipated by Vynne et al. (US patent 5,960,081.)

a. Vynne teaches a method of segmenting a media object for parallel watermarking operations, the method comprising:

for Claim 4

-- sub-dividing the media signal into segments based on analysis of the media signal to identify parts of media signal having signal characteristics that are more likely to carry a readable watermark signal; (Fig. 6.1; column 27, lines 7-18; The images are divided into blocks. *The media signal is divided into data of a block. The data of the block consists of coded image*

*data and motion vector of the block. **The data of the block is further sub-divided into image data** (the Displayed Frame Difference) **and motion vector of the block.** As analyzed by Vynne, motion vectors are more difficult to remove in the watermarking process, as stated in column 2, lines 12-21. This makes the watermark more readable at retrieval stage.)*

-- analyzing the media signal to prioritize segments of the media signal for digital watermark operations on the segments, wherein the media signal segments are prioritized for digital watermark embedding operations and wherein the media signal segments are prioritized such that segments that are more likely to carry a readable watermark signal are given higher priority for the embedding operations; (column 10, lines 32-48; column 24, line 65 to column 25, line 11; Fig. 6.1; The images are divided into blocks. A subset  $U(n)$  of blocks suitable for coding is selected using the selection criteria discussed from column 17, line 54 to column 22, line 21. The selection process is a prioritization process. (column 8, lines 25-35) The blocks are selected based on energy of a block to generate more-likely readable watermark signal. (column 33, lines 19-23) The blocks can be selected also based on a secret key to generate more-likely readable watermark signal, when the watermark is under attack.)

-- distributing the prioritized segments to parallel processors; (Fig. 7.2; column 26, line 1 to column 27, line 18; Fig. 7.2 shows the parallel processors. A group of  $B_{pe}$  blocks is sent to each processor. Segments are prioritized in each PE. Because the blocks of the image are distributed to the PEs, the prioritized segments are inherently distributed.)

-- performing parallel digital watermark embedding operations on the prioritized segments in the parallel processors according to priority order of the prioritized segments; (Fig. 7.2; column 26, line 1 to column 27, line 18; The analyzing is performed before sending selected

blocks for watermarking processor in each watermarking processor individually. Parallel digital watermark operations are performed on the prioritized segments after said analyzing.)

for Claims 18-19

-- sub-dividing the media signal into segments; (Fig. 6.1; column 27, lines 7-18; The images are divided into blocks.)

-- distributing the segments to parallel processors; (Fig. 7.2; column 26, line 1 to column 27, line 18; Fig. 7.2 shows the parallel processors. A group of  $B_{pe}$  blocks is sent to each processor.)

-- performing parallel digital watermark operations on the segments in the parallel processors (column 10, lines 32-48; Fig. 7.2; column 26, line 1 to column 27, line 18) wherein the media signal is segmented based on probability of watermark detection and prioritized for parallel watermark decoding operations based on probability of watermark detection; (*Column 17, lines 60-67; The image are segmented based on how probably a watermark in a block is invisible, namely detected by eyes. It is segmented based on the probability of human detection of the watermark. column 22, line 22 to column 24, line 58; The media signal is prioritized for parallel watermark decoding operations based on probability of watermark detection in the decoding process.*)

-- wherein the parallel processors comprise threads of execution on one or more hardware processing units; (column 26, lines 57-68; Each segment is processed separately and then combined.)

b. Vynne teaches a distributed digital watermark embedder comprising:

for Claims 23-24 and 26-28

-- a watermark signal generator for generating a watermark from a message; (column 1, lines 43-51; Fig. 6.1; column 9, lines 45-59; The part generating the signature is a watermark generator. The signature is related with author of a document or other information, which is a message. The final watermark is generated from the signature.)

-- a perceptual analyzer for perceptually analyzing a media signal and generating perceptual control parameters used to control application of the watermark to the media signal; (Fig. 6.1; "Criteria 612" is a perceptual analyzer. A subset  $U(n)$  of blocks suitable for coding is selected using the selection criteria based on perceptual analysis discussed from column 17, line 54 to column 22, line 21.)

-- a watermark applicator for receiving the media signal, the watermark and the perceptual control parameters, and for applying the watermark to the media signal according to the perceptual control parameters; wherein the watermark signal generator, the perceptual analyzer and the watermark applicator operate on distributed processors, wherein the distributed processors comprises independent threads of execution (Fig. 6.1; Fig. 7.2; column 10, lines 32-48; Fig. 7.2; column 26, line 1 to column 27, line 18; Embedder 618 is a watermark applicator. Each PE of Fig. 7.2 has the set shown in Fig. 6.1.) wherein variable watermarks are embedded in copies of a media signal by executing the perceptual analyzer on the media signal once to generate a perceptual mask that is dependent on the content of the media signal and is dependent on and automatically computed from the content of the media signal and is re-used by the watermark applicator to apply different watermarks from the watermark signal generator to the copies, the perceptual mask specifying areas of the media signal and is used to control

embedding of the watermark in the areas; (column 17, line 54 to column 22, line 22; column 27, line 59 to column 28, line 10; The criteria thresholds as those listed in column 22, lines 1-9 are the mask that is used for selecting blocks for watermarking and is dependent on and automatically computed from the content of the media signal. The thresholds are adjusted based on perceptual analysis through direct view. When a block is selected, it is specified. Therefore, the perceptual mask specifying blocks of the media signal and is used to control embedding of the watermark in the blocks.)

-- including a media signal segmentation processor for sub-dividing a media signal into segments for parallel processing in the embedder, wherein the embedder includes plural perceptual analyzers, which operate in parallel on segments of the media signal and wherein the embedder includes plural watermark signal applicators, which operate in parallel on segments of the media signal. (Figs. 6.1 and 7.2; column 27, lines 7-18; The images are divided into blocks. The part generating the signature is a watermark generator. "Criteria 612" is a perceptual analyzer. Embedder 618 is a watermark applicator. Each PE of Fig. 7.2 has the set shown in Fig. 6.1.)

***Claim Rejections - 35 USC § 103***

2. Claims 4, 18-19, 23-24, and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vynne et al. (US patent 5,960,081.)

(Please note: The rejections to Claims 20-22 presented in the same group of rejection in the Final-Rejection office action are not appeal herein.)

a. Vynne teaches a method of segmenting a media object for parallel watermarking operations, the method comprising:

for Claim 4

-- sub-dividing the media signal into segments based on analysis of the media signal to identify parts of media signal having signal characteristics that are more likely to carry a readable watermark signal; (Fig. 6.1; column 27, lines 7-18; The images are divided into blocks. *The media signal is sub-divided into data of a block. The data of the block consists of coded image data and motion vector of the block. As analyzed by Vynne, motion vectors are more difficult to remove in the watermarking process, as stated in column 2, lines 12-21. This makes the watermark more readable at retrieval stage.*)

-- analyzing the media signal to prioritize segments of the media signal for digital watermark operations on the segments, wherein the media signal segments are prioritized for digital watermark embedding operations and wherein the media signal segments are prioritized such that segments that are more likely to carry a readable watermark signal are given higher priority for the embedding operations; (column 10, lines 32-48; column 24, line 65 to column 25, line 11; Fig. 6.1; The images are divided into blocks. A subset  $U(n)$  of blocks suitable for coding is selected using the selection criteria discussed from column 17, line 54 to column 22, line 21. The selection process is a prioritization process. column 8, lines 25-35; The blocks are selected based on energy of a block to generate more-likely readable watermark signal.; column 33, lines 19-23; The blocks can be selected also based on a secret key to generate more-likely readable watermark signal, when the watermark is under attack.)

-- distributing the prioritized segments to parallel processors; (Fig. 7.2; column 26, line 1 to column 27, line 18; Fig. 7.2 shows the parallel processors. A group of  $B_{pe}$  blocks is sent to each processor.

Discussion A:

In column 26, line 27 to column 27, line 5, Vynne teaches the followings:

(1) Some predefined variables are used to make the execution different on the different processors. These variables also make it possible to make the system scalable; that is, to be able to run with a different number of processors without changing the C-code.

(2) Whenever two PE's want to exchange data in some way, the two PE's have to be synchronized by special commands.

It is evidently, (1) one program can direct each PE to perform different execution and (2) the PEs perform interactively with exchanging data, namely one PE can read the result of another PE to continue the task of said another PE. It is obviously that segments are prioritized in each PE and the prioritized segments are redistributed to other PEs when needed.)

-- performing parallel digital watermark embedding operations on the prioritized segments in the parallel processors after the analyzing of the media object to prioritize the segments; (Fig. 7.2; column 26, line 1 to column 27, line 18; Also see Discussion A above. The analyzing can be performed before sending selected blocks to each watermarking processor. Parallel digital watermark operations are performed on the prioritized segments after said analyzing.)

It is desirable to make each PE's process capability scalable to optimize the operation of the parallel processor. It would have been obvious to one of ordinary skill in the art, at the time

of the invention, to select blocks in a whole image as taught by Vynne with all used PEs and redistribute the selected blocks to Vynne's parallel processors for watermarking because the combination optimizes the operation of the parallel processor of Vynne.

This modification and motivation are also applied the subsequences sections.

b. Vynne further teaches a method of segmenting a media object for parallel watermarking operations, the method comprising:

for Claims 18-19

-- sub-dividing the media signal into segments; (Fig. 6.1; column 27, lines 7-18; The images are divided into blocks.)

-- distributing the segments to parallel processors; (Fig. 7.2; column 26, line 1 to column 27, line 18; Fig. 7.2 shows the parallel processors. A group of  $B_{pe}$  blocks is sent to each processor. Also see Discussion A above.)

-- performing parallel digital watermark operations on the segments in the parallel processors (column 10, lines 32-48; Fig. 7.2; column 26, line 1 to column 27, line 18) wherein the media signal is segmented based on probability of watermark detection and prioritized for parallel watermark decoding operations based on probability of watermark detection; (*Column 17, lines 60-67; The image are segmented based on how probably a watermark in a block is invisible, namely detected by eyes. It is segmented based on the probability of human detection of the watermark. column 22, line 22 to column 24, line 58; The media signal is prioritized for parallel watermark decoding operations based on probability of watermark detection in the decoding process. )*

-- wherein the parallel processors comprise threads of execution on one or more hardware processing units; (column 26, lines 57-68; Each segment is processed separately in a single PE or several PEs as explained in Discussion A above and then combined.)

In view of the Supreme Court opinion in *KSR Int'l Co. v. Teleflex, Inc.*, NO 04-1350 (U.S. Apr. 30, 2007), it would have been obvious to one of ordinary skill in the art, at the time of the invention, to try or arrange the watermark generator to generate the signal to be embedded for a first segment on a first processor, and the perceptual analyzer to generate the signal dependent parameters for the first segment on a second processor.

c. Vynne teaches a distributed digital watermark embedder comprising:  
for Claims 23-24 and 26-28

-- a watermark signal generator for generating a watermark from a message; (column 1, lines 43-51; Fig. 6.1; column 9, lines 45-59; The part generating the signature is a watermark generator. The signature is related with author of a document or other information, which is a message. The final watermark is generated from the signature.)

-- a perceptual analyzer for perceptually analyzing a media signal and generating perceptual control parameters used to control application of the watermark to the media signal; (Fig. 6.1; "Criteria 612" is a perceptual analyzer. A subset  $U(n)$  of blocks suitable for coding is selected using the selection criteria based on perceptual analysis discussed from column 17, line 54 to column 22, line 21.)

-- a watermark applicator for receiving the media signal, the watermark and the **perceptual control parameters**, and for applying the watermark to the media signal according

to the perceptual control parameters; wherein the watermark signal generator, the perceptual analyzer and the watermark applicator operate on distributed processors, wherein the distributed processors comprises independent threads of execution (Fig. 6.1; Fig. 7.2; column 10, lines 32-48; Fig. 7.2; column 26, line 1 to column 27, line 18; Embedder 618 is a watermark applicator. Each PE of Fig. 7.2 has the set shown in Fig. 6.1.) wherein variable watermarks are embedded in copies of a media signal by executing the perceptual analyzer on the media signal once to generate a perceptual mask that is dependent on the content of the media signal and is dependent on and **automatically computed from the content of the media signal** and is re-used by the watermark applicator to apply different watermarks from the watermark signal generator to the copies, the perceptual mask specifying areas of the media signal and is used to control embedding of the watermark in the areas; (column 17, line 54 to column 22, line 22; column 27, line 59 to column 28, line 10; The criteria thresholds as those listed in column 22, lines 1-9 are the mask that is used for selecting blocks for watermarking and is dependent on and automatically computed from the content of the media signal. The thresholds are adjusted based on perceptual analysis through direct view. When a block is selected, it is specified. Therefore, the perceptual mask specifying blocks of the media signal and is used to control embedding of the watermark in the blocks.)

-- including a media signal segmentation processor for sub-dividing a media signal into segments for parallel processing in the embedder, wherein the embedder includes plural perceptual analyzers, which operate in parallel on segments of the media signal and wherein the embedder includes plural watermark signal applicators, which operate in parallel on segments of the media signal. (Figs. 6.1 and 7.2; column 27, lines 7-18; The images are divided into blocks.

The part generating the signature is a watermark generator. "Criteria 612" is a perceptual analyzer. Embedder 618 is a watermark applicator. Each PE of Fig. 7.2 has the set shown in Fig. 6.1. )

3. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vynne et al. (US patent 5,960,081.)

Vynne teaches in one embodiment a method of segmenting a media object for watermarking operations, the method comprising:

-- sub-dividing the media object into parts different perceptual portions within the signal, including specifying the locations of parts to be embedded with corresponding digital watermark messages and providing data used to control embedding of the corresponding digital watermarking messages in the parts; (column 24, line 65 to column 25, line 11; Fig. 6.1; column 27, lines 7-18; The images are divided into blocks. A subset U(n) of blocks suitable for coding is selected using the selection criteria discussed from column 17, line 54 to column 22, line 21. The selection process is a prioritization process. Each segment is perceptually different from another inherently. *The data of frames are divided into parts associated with blocks, wherein each part includes the coded image data of a block and coded motion vector of the block. As evidently shown in Fig. 3.2 a block in a frame is specified by its location in the frame. Its motion vector is therefore also specified by the same location.*)

-- performing digital watermark operations on specified parts according to the data used to control the embedding. (column 10, lines 32-48; Fig. 7.2; column 26, line 1 to column 27, line 18; There are only two priority orders: suitable and non-suitable.)

Vynne teaches in another embodiment a method of segmenting a media object for parallel watermarking operations, the method comprising:

- distributing image signal to parallel processors for digital watermark; (Fig. 7.2; column 26, line 1 to column 27, line 18; Fig. 7.2 shows the parallel processors. A group of  $B_{pe}$  blocks is sent to each processor.)

- performing parallel digital watermark operations on the prioritized segments in the parallel processors according to the priority order of the prioritized segments; (column 10, lines 32-48; Fig. 7.2; column 26, line 1 to column 27, line 18; There are only two priority order: suitable and non-suitable.)

Vynne, in column 27, lines 9-10, teaches "the blocks are divided between different processors. The Examiner interpreted "the blocks" as the selected blocks. The Applicants interpreted "the blocks" as the blocks of the image prior the specifying process. For reducing the argument between the Applicants and the Examiner, the Examiner here takes the Applicants' position. Therefore, Vynne does not teach the limitation related to "distributing the specified parts to parallel processors after specifying the locations of the parts".

Vynne teaches, in column 26, line 1 to column 27, line 5, that using parallel processing reduces the processing time. The parallel processing can be applied to various tasks. Furthermore, in column 17, line 7 to column 22, line 21, Vynne selects blocks for watermarking based on visibility concern and the criteria related to a whole frame. It has a concern of having inadequate number of selected blocks in column 17, lines 45-53. In divided segments, it is more likely to have a segment with inadequate number of selected blocks than its corresponding whole image because its size is smaller than a whole image and the numbers are not even distributed

among the segments. It is desirable to have adequate number of selected blocks for watermarking an image. It would have been obvious to one of ordinary skill in the art, at the time of the invention, to select blocks in a whole image as taught by Vynne and distribute the selected blocks to Vynne's parallel processors for watermarking because the combination reduces a complicated synchronization mechanism as pointed out by Vynne. This modification thus teaches all the limitations recited in Claim 2.

4. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vynne et al. (US patent 5,960,081) in view of Hawkins et al. (US patent 6,389,421.)

(Please note: The rejections to Claims 14-16, 20, 22, 29-30 and 32-33 presented in the same group of rejection in the Final-Rejection office action are not appeal herein.)

a. Vynne teaches in one embodiment a method of segmenting a media object for watermarking operations, the method comprising:

-- sub-dividing the media object into parts different perceptual portions within the signal, including specifying the locations of parts to be embedded with corresponding digital watermark messages and providing data used to control embedding of the corresponding digital watermarking messages in the parts; (column 24, line 65 to column 25, line 11; Fig. 6.1; column 27, lines 7-18; The images are divided into blocks. A subset  $U(n)$  of blocks suitable for coding is selected using the selection criteria discussed from column 17, line 54 to column 22, line 21. The selection process is a prioritization process. Each segment is perceptually different from another inherently. *The data of frames are divided into parts associated with blocks, wherein each part includes the coded image data of a block and coded motion vector of the block. As evidently*

*shown in Fig. 3.2 a block in a frame is specified by its location in the frame. Its motion vector is therefore also specified by the same location.)*

-- performing digital watermark operations on specified parts according to the data used to control the embedding; (column 10, lines 32-48; Fig. 7.2; column 26, line 1 to column 27, line 18; There are only two priority orders: suitable and non-suitable.)

-- performed in priority order on the blocks based on an analysis of signal characteristics of the blocks for suitability of watermark embedding. (column 10, lines 32-48; column 24, line 65 to column 25, line 11; Fig. 6.1; The images are divided into blocks. A subset  $U(n)$  of blocks suitable for coding is selected using the selection criteria discussed from column 17, line 54 to column 22, line 21. The selection process is a prioritization process. column 8, lines 25-35; The blocks are selected based on energy of a block to generate more-likely readable watermark signal.)

However in this embodiment, Vynne does not teach features related to parallel processors recited in the claims.

b. Hawkins teaches a method of segmenting a media object for parallel watermarking operations, the method comprising:

for Claim 2

-- sub-dividing the media object into parts, including specifying the parts to be embedded with corresponding digital watermark messages and providing data used to control embedding of the corresponding digital watermarking messages in the parts; (column 9, lines 10-25; column 10, lines 22-61; column 12, lines 17-39; The media signal is divided based on jobs.; column 10, lines 4-62; The segments are prioritized based on the user of the media signal to set a schedule.)

-- distributing the specified parts to parallel processors after specifying of the parts to be embedded with corresponding digital watermark messages; (column 6, lines 26-34; column 12, lines 17-39; A single number of watermarking process is assigned per available processor.)

-- performing parallel digital watermark operations on the specified parts in the parallel processors according to the data used to control the embedding. (column 6, lines 26-358; column 12, lines 17-39; A single number of watermarking process is assigned per available processor.)

c. Hawkins points out the advantages of using multiple processors for parallel watermarking and delay problem associated with uneven distribution of watermarking processes in a multiple-processors machine. (column 3, line 60 to column 4, line 13)

It is desirable to speed up watermarking process. It would have been obvious to one of ordinary skill in the art, at the time of the invention, to (1) treat insertion of watermark signal in one of Vynne's selected blocks of as one of Hawkins' job and (2) distribute Vynne's selected blocks according to Hawkins' teaching to Hawkins' parallel processors for parallel watermarking operations because the combination speeds up watermarking process.

In view of the Supreme Court opinion in *KSR Int'l Co. v. Teleflex, Inc.*, NO 04-1350 (U.S. Apr. 30, 2007), it would have been obvious to one of ordinary skill in the art, at the time of the invention, to try or arrange the watermark generator to generate the signal to be embedded for a first segment on a first processor, and the perceptual analyzer to generate the signal dependent parameters for the first segment on a second processor.

5. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shinoda (US 6,611,830) in view of Vynne et al. (US patent 5,960,081.)

Shinoda teaches a batch digital watermark registration and embedding system comprising:

- a network interface for receiving ID registration requests, the requests including a list of media signal files and information to be linked with the media signal files via data embedded in the media signal files; (Fig. 1; column 1, lines 40-46; column 3, lines 7-50; column 5, lines 1-35; Many files, each having an ID, are inputted at least one by one for registration.)

- a batch registration loader for creating records in a registration database corresponding to identifiers for each of the media signal files; (column 4, line 64 to column 5, line 35; Fig. 5 shows records in the database.)

- a batch registration extractor for reading the registration database and creating an embedder control file, including identifiers, a corresponding list of media signal files, and embedding instructions for controlling embedding of the identifiers in the media signal files; (column 4, line 64 to column 5, line 35)

- a digital watermark embedder for performing digital watermark embedding operations on each file to hide the identifiers in the media signal files. (column 4, line 64 to column 5, line 46)

However, Shinoda does not teach the feature related to parallel digital water embedding.

Vynne teaches a system of segmenting a media signal for parallel watermarking operations, comprising:

-- sub-dividing the media signal into segments; (Fig. 6.1; column 27, lines 7-18; The images are divided into blocks.)

-- distributing the segments to parallel processors; (Fig. 7.2; column 26, line 1 to column 27, line 18; Fig. 7.2 shows the parallel processors. A group of  $B_{pe}$  blocks is sent to each processor.)

-- performing parallel digital watermark operations on the segments in the parallel processors. (column 10, lines 32-48; Fig. 7.2; column 26, line 1 to column 27, line 18)

It is desirable to speed up watermarking of data files. It would have been obvious to one of ordinary skill in the art, at the time of the invention, to use Vynne's parallel watermarking approach in Shinoda's system to perform parallel watermarking for a set of files, because the combination speeds up watermarking and therefore registration process. The combination thus teaches:

-- a parallel digital watermark embedder for segmenting media signal files into segments and for distributing the segments to parallel processors for performing parallel digital watermark embedding operations on the segments to hide the identifiers in the media signal files.

#### **(10) Response to Argument**

1. With respect to that Claims 4, 18-19, 23-24 and 26-28 are rejected under 35 U.S.C. 102(c) as being anticipated by U.S. Patent No. 5,960,081 by Vynne et al. ("Vynne")

For Claim 4

a. Applicants' argument -- Vynne does not disclose, teach or suggest: "sub-dividing the media signal into segments based on analysis of the media signal to identify parts of media signal having signal characteristics that are more likely to carry a readable watermark signal" in combination with the other elements of claim 1. Vynne's technique of modifying motion vectors is applied after the video is in block format as a result of these MPEG compression operations. Therefore, Vynne's method has no ability to modify or adapt the manner of sub-dividing the video into blocks according to an analysis of the media signal as claimed.

Examiner's response -- At first, the Examiner like to point out a typo. What the Applicants' referred "claim 1" in the above argument shall be "claim 4". Claim 4 recites "sub-dividing the media signal into segments based on analysis of the media signal to identify parts of media signal having signal characteristics that are more likely to carry a readable watermark signal". The Applicants' reading of Vynne's teachings is not what the Examiner presented in his Office Action. More specifically, the Examiner did not rely on "ability to modify or adapt the manner of sub-dividing the video into blocks" for teaching this feature as explained below. The Applicants' argument is thus not persuasive.

For Claim 4, the Examiner's interpretation is as follows. Vynne at first divides an image into blocks. Then Vynne sub-divides data of each block into segments of residual image data (the Displayed Frame Difference) and motion vectors. This is shown in the passage from column 13, line 44 to column 14, line 16 of Vynne. Evidently, in Vynne the media signal is sub-divided into segments of image data (the Displayed Frame Difference) and motion vectors. *The coded residual image data and their associated motion vectors are generated based on analysis of block matching and motion compensation. A user then uses this knowledge to identify the*

*motion vectors that have characteristics that are more likely to hide and carry a readable watermark signal as indicated in column 14, lines 43-53. In summary, Vynne teaches "sub-dividing the video media signal into the-residual-image data and their-associated- motion-vectors segments based on analysis of block matching and motion compensation on of the video media signal to identify motion vectors having signal characteristics that are more likely to carry a readable watermark signal".*

b. Applicants' argument -- The Office's contends that Vynne's teaching of selecting a subset of suitable blocks for coding of a signature in the motion vectors of those blocks corresponds to the claimed process. There are at least two significant errors in the Office's contention. First, merely selecting a subset of suitable blocks for motion vector coding does not suggest that the suitable blocks are prioritized for digital watermark embedding operations as claimed. Second, Vynne performs this selection of suitable blocks after all of the blocks are distributed to processors, and as such, Vynne does not distribute "the prioritized segments to parallel processors" as claimed.

Examiner's response -- Evidently, the disagreement between the Applicants and the Examiner is how one shall interpret the word "prioritized". The Examiner considered that "classifying Vynne's blocks for suitable or non-suitable coding of a signature in the motion vectors" is "analyzing the media signal to prioritize the segments". The Applicants disagreed against such interpretation.

Applicants are reminded that the Examiner is entitled to give the broadest reasonable interpretation to the language of the claims. So the Examiner considers such interpretation is within the broad meaning of the term. The Examiner is not limited to Applicants' definition

which is not specifically set forth in the claims. In re Tanaka et al., 193 USPQ 139, (CCPA) 1977. According to dictionary's definition, "priority" is "the fact or condition of being prior; precedent in time, order, importance, etc.". In the Examiner's interpretation, Vynne's blocks are prioritized into condition of importance for coding: one suitable and the other non-suitable. Unless the Applicants further specify the bound defined by their "priority", for example amending from "analyzing the media signal to prioritize the segments" to "analyzing the media signal to prioritize the segments into at least three priority levels", the Examiner considers that Vynne's meets this requirement.

In column 17-22, Vynne discusses that four different methods based on individual criteria, are combined into three different hybrid criteria for selecting suitable blocks. In the different hybrid criteria, prioritization is also performed. For example, in column 21, lines 15-18, Vynne teaches that blocks are selected in a frame by first applying the standard deviation criterion with  $C_0=2$  and then applying the histogram criterion. Blocks are first prioritized for watermarking by selecting those blocks having standard deviation larger than 2. The selected blocks, having standard deviation larger than 2, are then further selected with the histogram criterion. The motion vectors of the final selected blocks are the highest prioritized segments. Because the data of blocks of the image are distributed to the processors, the prioritized segments which consist of both suitable and non-suitable blocks are inherently distributed.

c. Applicants' argument -- Claim 4 positively recites "performing parallel digital watermark operations on the prioritized segments in the parallel processors according to a priority order of the prioritized segments." Vynne's non-suitable blocks are explicitly not selected nor operated upon as claimed, and as such, can not be deemed to correspond to prioritized

segments of claim 4. Regarding the selected blocks, Vynne does not process the selected blocks "according to a priority order." Therefore, Vynne's mere selection of suitable blocks does not correspond to the claim language for which it is cited.

Examiner's response -- The step of "performing parallel digital watermark operations on the prioritized segments in the parallel processors" recited in Claim 4 does not require to perform watermarking on **all** of prioritized segments. Even the non-suitable blocks are considered as part of the low priority segments and not watermarked, parallel digital watermark operations are performed on the segments which are prioritized as "suitable". Furthermore, it states that "... according to a priority order of the prioritized segments". "Selecting the suitable blocks" for watermarking is "... according to a priority order of the prioritized segments", because only suitable blocks are watermarked. Applicants are reminded again that the Examiner is entitled to give the broadest reasonable interpretation to the language of the claims.

d. Applicants' argument -- Moreover, claim 4 further recites that it is the prioritized segments that are distributed to the parallel processors. Vynne does not teach prioritizing the segments before distributing them to the parallel processors. In fact, Vynne's technique requires that the blocks be distributed to parallel processors before any subset of blocks is selected for coding. As described in the cited passage at col. 27, lines 6-19, Vynne distributes all of the blocks in the image to the processors. In equation 7.1, the numerator is  $mb$ , the number of blocks in the image, and the denominator is  $NPES$ , the number of processors. Thus, all of the blocks in the image are distributed to the processors prior to any selection of blocks for coding.

Examiner's response -- The feature under argument here is "distributing the prioritized segments to parallel processors". The feature as recited does not absolutely require "prioritizing

the segments before distributing them to the parallel processors". It only set a condition that the prioritized segments are distributed to parallel processors. As pointed out in the Final rejection that in Vynne, segments are prioritized in each PE. Because the blocks of the image are distributed to the PEs, the prioritized segments are inherently distributed to the parallel processors.

For Claims 18-19

Applicants' argument -- Vynne fails to disclose, teach or suggest: "performing parallel digital watermark operations on the segments in the parallel processors wherein the media signal is segmented based on probability of watermark detection and prioritized for parallel watermark decoding operations based on probability of watermark detection" in combination with the other elements of claim 18. The video in Vynne is in a block format as a result of MPEG compression coding. Because the MPEG-2 video compression standard sets forth a fixed method for subdividing the video into fixed blocks in Vynne, this MPEG video is not segmented based on probability of watermark detection and prioritized for parallel watermark decoding operations based on probability.

Examiner's response -- For Claim 18, in Vynne Video signal is divided into frames. Each frame is then sun-divided into blocks. Each block data consists of *coded image data and motion vector of the block*. *As analyzed by Vynne, the block data are segmented into two classes: blocks suitable for watermark coding and not suitable. The segmentation automatically assigned priority to these two classes of blocks. One of the criteria for suitability is based on probability of watermark detection as shown in Column 17, lines 60-67 and column 22, line 22 to column 24,*

line 58. Applicants are reminded again that the Examiner is entitled to give the broadest reasonable interpretation to the language of the claims.

For Claim 23

a. Applicants' argument -- The Office wrongly contends that Vynne's thresholds at col. 22, lines 1-9, correspond to the claimed perceptual mask. These thresholds in Vynne are used for selecting blocks having a certain criteria for coding, not for controlling the embedding in those blocks. Vynne's thresholds are not dependent on and automatically computed from the content of the media signal as recited in claim 23 in combination with the other elements. It is acknowledged that Vynne's thresholds are manually adjustable by a user using DirectView as described at the bottom of col. 27 to col. 28.

Examiner's response -- The Examiner likes to point out that, in Vynne, "coding" is "watermarking". For example, in column 17, lines 55-56, it states that selection criteria are needed to select the blocks suitable for coding. Here "coding" is to code the signature. Therefore, all the thresholds used for selecting blocks for coding a signature correspond to a perceptual mask. In column 28, lines 16-17, 27-28, and column 28, line 49 to column 29, line 17, Vynne teaches how to use computer to tune thresholds to reach final selected threshold values. The tuning can be performed on-line. The calculation to reach the final selected threshold values is an automatic calculation performed by the computer. The bottom of col. 27 to col. 28 of Vynne only indicates that the results can be visualized. It does not say that the calculation is not done automatically by a computer. Furthermore, it does not say this is the only approach. As the Examiner pointed out above, Vynne explicitly teaches the automatic calculation. Also automatic

calculation are evidently in Vynne from the following evidences: "A small adaptive-thresholding algorithm is used cited in column 19, lines 19-22; and "Appropriate values for  $C_{bw}$  and  $C_z$  are determined by experiments cited in column 20, lines 12-13.

b. Applicants' argument -- Claim 23 further recites: "the perceptual mask specifying areas of the media signal and is used to control embedding of the watermark in the areas." Vynne's thresholds do not specify areas of the watermark signal as claimed.

Examiner's response -- The Examiner disagreed. As the Examiner discussed above with regard to Claim 4, Vynne discusses three different hybrid criteria for selecting suitable blocks for watermark coding in column 17-22. Each of the criteria has at least one threshold for which blocks are selected for watermark coding. Accordingly, the at least one threshold also control embedding of the watermark in the areas.

For Claims 24 and 26-28

The above response for Claim 23 is also applicable to the Applicants' argument with regard of the dependent Claims 24 and 26-28.

2. With respect to that Claims 4, 18-19, 23-24, and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vynne et al. (US patent 5,960,081)

Applicants' argument -- Since the Applicant considered the Office's interpretations for the obviousness rejection in the previous section of the Appeal brief (with heading Claims 4,18-19 and 23-24,26-28 are not anticipated by Vynne shown in pages 2-6 of the Appeal Brief), the same

arguments apply to the obviousness rejection over Vynne. Thus, the arguments from the previous section are repeated in pages 6-10 in the Appeal Brief.

Examiner's response --

a. The Examiner likes to point out that the Applicants' referred "rejection in the previous section" is anticipation rejection, not the obviousness rejection as stated by the Applicants in the Brief. The Examiner compared the Applicants' arguments for this obviousness rejection in the Brief, they are exactly the same as those presented for the anticipation rejection. Accordingly, the above Examiner's responses presented in section(10)1 of this Examiner Answer are also applicable herein.

b. The Applicants did not provide any argument why Claims 4, 18-19, 23-24, and 26-28 are not obvious with respect to the teachings of Vynne et al. (US patent 5,960,081) as presented by the Examiner in the Final Rejection. *How can the arguments to counter a anticipation rejection be applicable to an obviousness rejection, because they have different grounds of rejections?*

Even assuming that the feature "distributing the prioritized segments to parallel processors" has to be read as "distributing the prioritized segments to parallel processors after the segments are first prioritized" as maintained by the Applicants, the Examiner considered that Claims 4, 18-19, 23-24, and 26-28 are obvious with respect to the teachings of Vynne.

In the passage from column 26, line 27 to column 27, line 5, Vynne teaches the followings to show how tasks of watermarking image blocks can be obviously rearranged and distributed: Some predefined variables are used to make the execution different on the different processors (teaching 1). and Whenever two PE's want to exchange data in some way, the two

PE's have to be synchronized by special commands (teaching 2). It is evidently, one program can direct each PE to perform different execution with the teaching 1 and the PEs perform interactively with exchanging data with teaching 2, namely one PE can read the result of another PE to continue the task of said another PE. It is obviously that segments can be prioritized in each PE and the prioritized segments can be redistributed to other PEs when needed. The above teachings indicate that how to distribute blocks for watermarking is an obvious design choice. It is desirable to make each PE's process capability scalable to optimize the operation of the parallel processor. In view of the Supreme Court opinion in KSR Int'l Co. v. Teleflex, Inc., NO 04-1350 (U.S. Apr. 30, 2007), it would have been obvious to one of ordinary skill in the art, at the time of the invention, to select blocks in a whole image as taught by Vynne first and distribute the selected blocks to Vynne's parallel processors for watermarking because the combination optimizes the operation of the parallel processor of Vynne.

The Applicants did not counter the Examiner's obvious modification.

3. With respect to that Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vynne et al. (US patent 5,960,081)

Applicants' argument -- Vynne does not distribute "the specified parts to parallel processors after the specifying the locations of the parts to be embedded with corresponding digital watermark messages" as recited in claim 2 in combination with the other claim elements.

Examiner's response -- In the Final Rejection, for reducing the argument between the Applicants and the Examiner, the Examiner took the Applicants' position and accepted the

Applicants' conclusion for this ground of rejection that "Vynne does not teach the limitation related to "distributing the specified parts to parallel processors after specifying the locations of the parts".

However, the Examiner pointed out there that "it would have been obvious to one of ordinary skill in the art, at the time of the invention, to select blocks in a whole image as taught by Vynne and distribute the selected blocks to Vynne's parallel processors for watermarking because the combination reduces a complicated synchronization mechanism as pointed out by Vynne". *In this Appeal Brief, the Applicants do not challenge the above conclusion.*

4. With respect to that Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vynne et al. (US patent 5,960,081) in view of Hawkins et al. (US patent 6,389,421)

Applicants' argument -- Regarding claim 2, the combined teachings of Vynne and Hawkins do not suggest: "distributing the specified parts to parallel processors after the specifying of the locations of the parts to be embedded with corresponding digital watermark messages" in combination with the other elements of claim 2. The Office contends that "A task associated with points is a block of signal." In Hawkins, "points" are a unit for a processing resource to be assigned to a processing task. There is no suggestion of associating such units of processing resources to a block of a signal. Therefore, Hawkins does not teach the elements of claim 2 that are missing from Vynne. As such, the combination of the two references fail to disclose or teach all of the elements of claim.

Examiner's response -- The Examiner did not rely only on either Vynne or Hawkins to teach this feature. It is their combination teaching it. The logic of obvious rejection based on the combination of Vynne and Hawkins is that: (1) Vynne teaches selecting image blocks for watermarking a video; (2) Hawkins teaches segmenting a general media object for parallel watermarking operations; and (3) It would have been obvious to one of ordinary skill in the art, at the time of the invention, to (a) treat insertion of watermark signal in one of Vynne's selected blocks of as one of Hawkins' job and (b) distribute Vynne's selected blocks according to Hawkins' teaching to Hawkins' parallel processors for parallel watermarking operations because the combination speeds up watermarking process. *The Applicants did not present persuasive arguments why they cannot be combined.*

5. With respect to that Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shinoda (US 6,611,830) in view of Vynne et al. (US patent 5,960,081)

Applicants' argument -- Claim 34 is patentable over Shinoda in view of Vynne. Shinoda only teaches embedding one image at a time. Therefore, it does not teach any of the elements of claim 34 relating to batch processing, such as "the requests including a list of media signal files and information to be linked with the media signal files," and "a batch registration extractor for reading the registration database and creating an embedder control file, including identifiers, a corresponding-list of media signal files, and embedding- instructions for controlling embedding of the identifiers in the media signal files". Vynne does not teach any of these elements either, therefore, the combination fails to teach all of the elements of claim 34.

Examiner's response -- The Examiner recited several portions of Shinoda for teaching embedding multiple documents. Applicants did not provide clear explanation why the Examiner's recited portions do not meet the recited limitation, especially with respect to the above stated points.

Applicants' arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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5/13/2009

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